



## EPA Region 7 TMDL Review

**TMDL ID:** MO\_2916                      **Waterbody ID:** MO\_2916  
**Waterbody Name:** BIG CREEK  
**Tributary:** Scoggins Branch  
**Pollutant:** METALS  
**State:** MO                                      **HUC:** 08020202  
**BASIN:** St. Francis River Subbasin  
**Submittal Date:** 12/28/2005  
**Approved:** Yes

### Submittal Letter

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

A letter submitting this TMDL for approval, dated December 23, 2005, was received by EPA on December 28, 2005. Revision emailed and received, January 24, 2006.

### Water Quality Standards Attainment

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

The loading capacity is defined by the numeric water quality criteria for metals which are hardness dependent. A significant relationship was found between flow and hardness and the resulting equations were used to derive a load duration curve.

The loading capacity is calculated at the monitoring site known as #004 in the Glover Smelter permit. The present load is depicted in load duration curves (figures 2-4), which give a graphical expression of the TMDL, both acute and chronic, at all percentiles of flow. This TMDL is determined by calculating the load that will result in reduction of the existing concentration to meet the criterion for each metal. The TMDL will meet the new proposed water quality standards for metals. Missouri WQS revision proposes new metal criteria. The new criteria determination is based on EPA's guidance (EPA820B96001). For protection of aquatic life, the criteria for metals shall be expressed in ug/L of dissolved metal and go into effect December 31, 2005.

### Numeric Target(s)

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

The TMDL describes all applicable WQS and the beneficial uses; the impaired use is the warm water aquatic life use. The target is the water quality criteria for metals, both acute and chronic toxicity. Dry weather calculations were based on the 25th percentile of hardness concentrations expressed as mg/L of CaCO<sub>3</sub>. Table 4 shows the percent reductions needed to meet acute WQS in Scoggins Branch and chronic WQS in Big Creek. The TMDL will meet the new proposed water quality standards for metals. Missouri WQS revision proposes new metal criteria. The new criteria determination is based on EPA's guidance (EPA820B96001). For protection of aquatic life, the criteria for metals shall be expressed in ug/L of dissolved metal and go into effect December 31, 2005.

**Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

The target is the water quality criteria for acute and chronic toxicity; the link between the target and each criterion is hardness dependent. The observed hardness at various flow conditions were used to establish the targets. The load duration curve was used to calculate the TMDL in general because it relies on measured water quality data. The TMDL will meet the new proposed water quality standards for metals. Missouri WQS revision proposes new metal criteria. The new criteria determination is based on EPA's guidance (EPA820B96001). For protection of aquatic life, the criteria for metals shall be expressed in ug/L of dissolved metal and go into effect December 31, 2005.

The macro invertebrate community shows signs of impairment from the metal loading. Sampling showed impairment of the invertebrate community, especially mayflies, a group that is sensitive to metals pollution.

**Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

Land use and sources in the TMDL are described. There is one discharging facility (Glover Smelter permit #MO-0001121, which is no longer in operation). Associated with the smelter facility there are also waste piles which are regulated under a storm water permit (permit #MO-0127434). All significant sources were discussed.

**Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

The loading capacity is calculated at the monitoring site known as #004 in the Glover Smelter permit. It is located at a broken low bridge downstream from the confluence of Scoggins Branch, where the permitted facility discharged. The present load is depicted in load duration curves (figures 2-4), which give a graphical expression of the TMDL, both acute and chronic, at all percentiles of flow. This TMDL is determined by calculating the load that will result in reduction of the existing concentration to meet the criterion for each metal.

**WLA Comment**

Dry weather calculations were based on the 25th percentile of hardness concentrations expressed as mg/L of CaCO<sub>3</sub>. The maximum calculated concentrations in the discharge, daily load, and Big Creek 7Q10 concentration are listed in table 2 of the TMDL.

Storm water WLA calculations were performed in two steps: 1) final storm water effluent concentration reductions were made to conform to acute water quality targets (of proposed standards) at the "end of pipe". This reduction would be protective of aquatic life from acute toxicity in Scoggins Branch (only acute criteria apply because Scoggins is an unclassified stream). 2) Calculated the capacity of Big Creek to assimilate storm water loads of the metals and meet the chronic criteria (an analysis of flow stability and metals concentration showed chronic conditions applied even at high flow). Dissolved metals concentration was calculated with both the dry weather TMDL and the storm water load from the slag piles. Table 4 shows the percent reductions needed to meet acute WQS in Scoggins Branch and chronic WQS in Big Creek. For each metal, a WLA is assigned based on the greater of the two required reductions. Summary show in Table 5 of the TMDL.

## **LA Comment**

All background samples in Big Creek have been below the limit of detection. The load allocation for all three metals being addressed by this TMDL will be set at zero. If nonpoint sources are found to cause violations of WQS for cadmium or lead, these load sources will be addressed in Phase II of this TMDL.

## **Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The margin of safety is implicit and derived from 2 conservative assumptions in the analysis. 1.) The TMDL will meet the new proposed water quality standards for metals, 2.) Calculating the standard based on the lower 25th percentile of the measured hardness concentrations.

## **Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

Seasonal variation and critical conditions are considered in the use of the load duration curve methodology, which accounts for loads at all flow conditions. The water quality data collected represents all seasons. This TMDL addresses wet and dry weather.

## **Public Participation**

*Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

Public notice period was from November 18 to December 18, 2005. No comments were received.

## **Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

Sediment studies were conducted by the department in Big Creek below Glover Smelter in 2004 and 2005, with more scheduled in 2007. Fish tissue will be sampled in 2007. The US Geological Survey maintains annual ambient water quality monitoring in Big Creek at Sam Baker State Park, about 25 miles downstream of the smelter. Monitoring is also included in the Remedy Work Plan, outlined in the TMDL. If continued monitoring reveals that water quality standards are not being met, the TMDL will be reopened and re-evaluated.

## **Reasonable assurance**

*Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.*

The load allocation is set at zero. Reasonable assurance is not required. A final Remedy Work Plan for Glover Lead Facility was published in 2001 with plans and schedules. Asarco is responsible for the closure of two inactive slag piles, as part of the sale agreement between Asarco and Doe Run.